MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

Permitting and Compliance Division
Water Protection Bureau
P.O. Box 200901
Helena, MT 59620-0901

Permit Fact Sheet
Montana Ground Water Pollution Control System (MGWPCS)

Permittee:	Frenchtown School District
Permit No.:	MTX000207
Receiving Water:	Class I Ground Water
Facility Information	
Name:	Frenchtown High School and Junior High School
Mailing Address:	17620 Frenchtown Frontage Road Frenchtown, MT 59834
Contact:	Randy H. Cline
Phone:	(406) 626-2670 or (406) 626-5222
Fee Information	
Number of Outfalls:	2
Outfall - Type:	001 Drainfield 002 Drainfield

I. Permit Status

This is a new permit for an upgrade and addition to an existing wastewater treatment system that is part of the Frenchtown High School (FHS) and Junior High School (JHS) located in Frenchtown, MT. The FHS is currently discharging wastewater to state waters without a Department authorized discharge permit. FHS is not exempt from the need for a permit under the Montana Water Quality Act (75-5-401) and the Administrative Rules of Montana (ARM) 17.30.1022 (1) (c). The Department received the initial permit application and supporting documents on December 26, 2007. The application was determined to be deficient on January 3, January 21, and March 20, 2008. The Department received responses to all the deficiency letters. Supplemental application materials were received and the permit application was deemed complete on August 11, 2008.

II. Facility Information

A. Facility Description

Discharges from the FHS, JHS, vocational building and football stadium facilities will consist of domestic wastewater. Wastewater discharged from the FHS and JHS will discharge to the southern most drainfield, wastewater from the vocational building and football bleachers will discharge to the northern most drainfield. The applicant has proposed to upgrade the existing wastewater treatment systems and drainfields as well as construct additional drainfields at all locations. The wastewater treatment system servicing the FHS and JHS will be upgraded with: one 15,000 gallon; one 8,500 gallon and one 5,000 gallon septic tank, one 1,500 gallon and one 8,500 gallon dose tank. Discharge to state waters will be through a six zone drainfield located in the south western portion of the site. The wastewater treatment system servicing the vocational buildings and bleachers will be constructed with one 2,500 gallon septic tank, one 5,000 gallon septic tank, and one 2,000 gallon dosing tank. Discharge to state waters will be through a one zone drainfield located in the northwestern portion of the site (Appendix A). Engineering design reports submitted to the Department by the applicant indicated a design capacity of 12,480 gpd and 2,220 gpd for the FHS/JHS and Vocational building/bleachers respectively.

The anticipated permit will authorize discharge of residential wastewater to two (2) drainfields (Outfalls 001 and 002) which will then discharge to ground water (Appendix A). The applicant applied for two outfalls. The drainfields servicing the FHS and JHS School shall be identified as Outfall 001. The drainfields servicing the vocational school and the bleachers shall be identified as Outfall 002. Outfall 001 will be located approximately 1.0- 2.0 feet below the ground surface. Outfall 001 is located at N 47º 01’ 17” latitude and W 114º 14’ 32” longitude situated in T 15N, R 21W, Section 34. Outfall 001 is hydraulically down-gradient, and on the southwest side of the FHS property. Outfall 002 will be located approximately 1.0- 2.0 feet below the ground surface. Outfall 002 is located at N 47º 01’ 20” latitude and W 114º 14’ 36” longitude situated in T 15N, R 21W, Section 34. Outfall 002 is up-gradient hydraulically and on the north west side of the FHS property.

B. Effluent Characteristics

The wastewater treatment system is an existing source; as such septic tank effluent quality samples were collected and analyzed. One sampling event occurred on February 29, 2008. Effluent characteristics of the wastewater that was sampled is listed in Table 1.

Table 1. Effluent Characteristics

Parameter	Units	Results
Ammonia	mg/L	59.0
Biological Oxygen Demand (BOD)	mg/L	732
Chloride	mg/L	58
Total Coliform	CFU/100 ml	2,420
Conductivity	µmhos/cm	1030
Nitrogen Total	mg/L	83.6
pH	S.U	6.98
Total Phosphorous	mg/L	10.6

Total Dissolved Solids (TDS)	mg/L	81
Total Kjeldahl Nitrogen (TKN)	mg/L	83.6
Total Suspended Solids (TSS)	mg/L	581

III. Proposed Technology Based Effluent Limits

The applicant indicated that there are no existing, pending, certifications, approvals or permits for this facility and that the permit application is for a new permit (PCI 2007). Therefore discharge of wastewater through the FHS wastewater treatment systems is considered a new or increased source pursuant to ARM 17.30.702(18), and subject to the Nondegradation rules of ARM 17.30.701-718. The Department also regards this wastewater treatment system (a septic tank/drainfield) a conventional system. Therefore the non degradation rules of ARM 17.30.702 (18) and ARM 17.30.715 (1)(d)(ii) respectively apply to this system. The Department considers an average nitrate concentration of effluent discharged from a conventional system to be 60 mg/L. This value was estimated from the Environmental Protection Agency, Design Manual: On site Wastewater Treatment System Manual (EPA 2002). The Department allows for 10 % removal of nitrogen in the septic tank. This would provide an effluent concentration of 54 mg/L nitrate. An additional 7% of nitrogen removal is assumed to occur within the drainfield providing a final TN concentration discharged to ground water of 50 mg/L. The proposed technology based effluent limits for Outfall 001 and 002 are therefore set at 54 mg/L (Table 2).

Table 2. Nondegradation Based Effluent Limit for Outfall 001 and 002

Parameter	Concentration (mg/L) Daily Maximum (1)
Total Nitrogen as N	54

(1) See definitions, Part I.A of the permit

IV. Water-Quality Based Effluent Limits

A. Receiving Water

The applicant submitted ground water analytical data from wells around the wastewater treatment system. All ground water quality data used in development of permit conditions comes from wells that are located within one mile of the discharge locations. Ground water quality sampling was conducted from one on site monitoring well finished in the shallow aquifer. Well logs for this well indicate a total depth of about 38 feet and indicate the presence of shallow ground water at approximately 10 feet below ground surface. The monitoring well is a shallow domestic well located approximately 750 feet up-gradient of the existing discharge (Ground Water Information Center [GWIC] ID # 71817). Sampling events occurred on January 1, 2008, April 7, 2008 and June 22, 2008. Ground water quality analysis for the above mentioned sampling events is listed in Table 3.

Application materials submitted to the Department on behalf of the applicant, by Professional Consultants Inc. (PCI) reported the hydraulic conductivity of the aquifer as 857 ft/day. This estimate is derived from a ground water study conducted on site (Lauerman 1999). Hydrualic conductivities were generated from slug tests, pump tests, tracer tests and grain size analysis. These tests revealed conductivities of 7-200 ft/day, 675-1040 ft/day, 700-1000 ft/day and 3-630

ft/day respectively. The average value from pump tests data (857 ft/day) will be used as a hydraulic conductivity. Shallow ground water occurs in the vicinity of the site between 0-30 feet, as confirmed by on site wells and ground water studies conducted on the FHS property (Lauerman, 1999). The hydraulic gradient in the shallow ground water was reported as 0.002 ft/ft, estimated from 3 on site monitoring wells.

Table 3. Ground Water Monitoring Results From GWIC Well 71817

Date Samples	Nitrate mg/L	Nitrite mg/L	BOD mg/L	pH	Total Phosphorous mg/L	Chloride mg/L	Total Suspended Solids mg/L	Conductivity (umhos/cm)
January 21, 2008	0.29	ND	ND	7.61	0.02	2.5	1	348
April 7, 2008	0.23	ND	ND	7.99	0.04	3.0	ND	332
June 22, 2008	0.37	ND	ND	7.99	0.04	2.0	1	320

Sampling events (Table 3) yielded specific conductivity values of between 304 and 383 umhos/cm. Therefore, the receiving water for Outfall 001and 002 is considered class I ground water as defined by the Administrative Rules of Montana [ARM 17.30.1006 (1)(a)] (ground water with specific conductance equal to or less than 1,000 microSiemens/cm). Class I ground water is to be maintained for the following beneficial uses with little or no treatment: public and private water supplies, culinary and food processing purposes, irrigation, drinking water for livestock and wildlife and for industrial and commercial uses. Water quality human health standards (DEQ-7, February 2006) apply to concentrations of substances in Class I ground waters. Pursuant to ARM 17.30.1006(1)(b)(ii) for parameters that are not listed in DEQ-7, there shall be no increase in Class I receiving water concentrations to levels that render the water harmful, detrimental or injurious to the beneficial uses listed for Class I waters. The Department may use any credible information to determine these levels. Class I ground waters are considered high quality waters and are subject to Montana's Nondegradation Policy [75-5-303, Montana Code Annotated (MCA)].

The National Resources Conservation Service (NRCS) indicates that soils in the vicinity of the wastewater treatment system are primarily 79% Alberton very fine sandy loam (0-9 inches very fine sandy loam, 9-16 inches sandy loam, 16-30 inches sandy loam, 30-60 inches loamy sand) and 21% Moiese gravelly loam (0-9 inches gravelly loam, 9-21 inches very gravelly sandy loam, 21-60 inches extremely gravelly sand). These estimates of soil physical properties agree with test pits dug on site. Six test pits were dug on site and ranged in depth from 96-105 inches. Soil profiles indicated the presence of sandy loam, fine sandy loam, medium sand, fine sand and sand.

Based on proximity, the nearest surface water to Outfalls 001 and 002 is a portion of an unnamed irrigation canal, approximately 528 feet north and up gradient of the proposed discharge. Based on the direction of ground water flow, the nearest surface water to Outfalls 001 and 002 is an unnamed slough, approximately 2,500 feet down gradient. Ground water flow direction in the vicinity of the drainfield was reported to be approximately S30°W. Ground water flow direction of the shallow aquifer was established via static water level measurements collected from monitoring wells on-site.

B. Basis for Water Quality Based Effluent Limits

ARM 17.30.506 (1) states that a discharge to state waters shall not cause a violation of a water quality standard outside a Department authorized mixing zone. Water quality limitations must be established in permits to control all pollutant or pollutant parameters that are or may be discharged at a level which will cause, have reasonable potential to cause or contribute to an excursion above any state water quality standard. The permittee must comply with the permit developed by the Department in accordance with the Montana Numeric Water Quality Standards included in Circular DEQ-7 (February 2006) and protection of beneficial uses (ARM 17.30.1006).

The applicable ground water standard, a nitrate concentration of 5.0 mg/L at the end of the proposed standard mixing zone is based on nondegradation rules [ARM 17.30.715 (1)(d)(ii)]. The Department assumes all the nitrogen discharged to the drainfield in the effluent is converted to nitrate as nitrogen. The allowable discharge concentration is derived from the mass balance water quality equation, which considers dilution and background concentration of the receiving water (EPA, 2000).

$$C_2 = \frac{C_3(Q_1 + Q_2) - C_1 Q_1}{Q_2}$$

C_1= ambient ground water (background) concentration, mg/L
C_2 = allowable discharge concentration, mg/*L*
C_3 = ground water concentration limit for pollutant (from Circular DEQ-7 February 2006 or other appropriate water quality standard) at the end of the mixing zone.
Q_1 = ground water volume (ft^3 / day)
Q_2 = maximum flow of discharge (design capacity of system in ft^3 / day)

The volume of ground water that will mix with the discharge (Q_s) is estimated using Darcy's equation: Q = K I A.

Where: Q = ground water flow volume (ft^3/day)
K = hydraulic conductivity (ft/day)
I = hydraulic gradient (ft/ft)
A = cross-sectional area (ft^2) of flow at the down-gradient boundary of the mixing zone.

OUTFALL 001

The design capacity of the entire wastewater disposal system is 12,480 gpd, or 1668 ft^3/day. Hydraulic conductivity (K) of the alluvium is estimated at 857 feet per day (ft/d). The gradient was calculated based on well data from wells surrounding the site, at 0.002 ft/ft. The area (A) is calculated by the width of the terminus of the mixing zone perpendicular to the ground water flow direction, times a depth to shallow ground water of 10 feet.

$$(Q_{-001}) = (857 \text{ ft/day})(0.002 \text{ ft/ft})(6{,}000 \text{ ft}^2)$$

$$Q_{-001} = 10{,}284 \text{ ft}^3\text{/day}$$

The applicable water quality standard of 5.0 mg/L must be met at the end of the mixing zone. The permit application indicated an up gradient Nitrate plus Nitrite (as N) concentration of 0.37 mg/L. Therefore a concentration of nitrate (as N) of 0.37 mg/L was used in calculating the allowable nitrogen concentration at the end of the mixing zone. It is assumed that the entire total nitrogen load in the seepage effluent converts to nitrate and enters the ground water.

$$C_2 = \frac{5.0 \text{ mg/L } (10{,}284 \text{ ft}^3\text{/day} + 1{,}668 \text{ ft}^3\text{/day}) - (0.37 \text{ mg/L}) (10{,}284 \text{ ft}^3\text{/day})}{(1{,}668 \text{ ft}^3\text{/day})}$$

$$= 33.5 \text{ mg/L}$$

The projected daily maximum concentration of the total nitrogen in the effluent discharged to ground water must not exceed 33.5 mg/L at Outfall 001. The Department assumes an additional 7% nitrogen removal occurs within the drainfield providing a final total nitrogen concentration discharged to ground water of 35.8 mg/L. These effluent limits ensure the nitrate plus nitrite (as N) concentration at the end of the ground water mixing zones are at or below the nondegradation significance criterion of 5.0 mg/L.

OUTFALL 002

The design capacity of the entire wastewater disposal system is 2,220 gpd, or 297 ft^3/day. K of the alluvium is estimated at 857 feet per day (ft/d). The gradient was calculated based on well data from wells surrounding the site, at 0.002 ft/ft. The area (A) is calculated by the width of the terminus of the mixing zone perpendicular to the ground water flow direction, times a depth to the shallow ground water of 15 feet.

$$(Q_{-002}) = (857 \text{ ft/day})(0.002 \text{ ft/ft})(2{,}100 \text{ ft}^2)$$

$$Q_{-002} = 3{,}599 \text{ ft}^3\text{/day}$$

The applicable water quality standard of 5.0 mg/L must be met at the end of the mixing zone. The permit application indicated a Nitrate plus Nitrite (as N) concentration of 0.37 mg/L. Therefore a concentration of nitrate (as N) of 0.37 mg/L was used in calculating the allowable nitrogen concentration at the end of the mixing zone. It is assumed that the entire total nitrogen load in the seepage effluent converts to nitrate and enters the ground water.

$$C_2 = \frac{5.0 \text{ mg/L } (3{,}599 \text{ ft}^3\text{/day} + 297 \text{ ft}^3\text{/day}) - (0.37 \text{ mg/L}) (3{,}599 \text{ ft}^3\text{/day})}{(297 \text{ ft}^3\text{/day})}$$

$$= 61.1 \text{ mg/L}$$

The projected daily maximum concentration of the total nitrogen in the effluent discharged to ground water must not exceed 61.1 mg/L at Outfall 002. The Department assumes an additional 7% nitrogen removal occurs within the drainfield providing a final total nitrogen concentration discharged to ground water of 65.3 mg/L. These effluent limits ensure the nitrate plus nitrite (as N) concentration at the end of the ground water mixing zones are at or below the nondegradation significance criterion of 5.0 mg/L.

D. Phosphorus

Phosphorus in the effluent is removed mainly through soil sorption processes, which vary based on soil composition. The 50-year breakthrough nondegradation criterion is based on the amount of soil available to adsorb the average load of phosphorus from the wastewater source, between the discharge point and the closest downgradient surface water. Total phosphorus limitations are imposed to ensure that the quality of the effluent meets the nondegradation limit prior to discharge into any surface water [ARM 17.30.715(1)(e)]. Phosphorous breakthrough analysis calculations are mass-based; therefore, the limit will be load based.

A phosphorous breakthrough analysis was conducted using information provided by the applicant, submitted as part of permit application materials. The applicant indicated a depth to a limiting layer based on the depth to shallow ground water (10.0 ft) in wells around the site. Department guidance on how to conduct the phosphorous breakthrough analysis (Regensburger 2005) indicate that a limiting layer can be the seasonal ground water level.

The Department has historically used a value for effluent phosphorous concentration from a subsurface wastewater treatment system of 10.6 mg/L. The design capacities for outfall 001 and 002 are 12,480 gpd and 2,220 gpd for the respectively. Discharges from both outfalls at design capacities would yield a potential load of 402 lbs/yr and 71.6 lbs per year for outfall001 and 002 respectively

OUTFALL 001

Using this depth to limiting layers (10.0’), a phosphorous load based on average phosphorous concentrations and the design capacity of the treatment system, the expected phosphorous load to state waters and the distance from outfall 001 to the closest surface water, an unnamed slough (approximately 3,000 feet south southwest and down gradient of the proposed drainfields) the breakthrough time for phosphorus is 85.9 years. This breakthrough time is considered nonsignificant pursuant to Montana’s Nondegradation criteria [ARM 17.30.715(1)(e)].

A phosphorous breakthrough from Outfall 001 would occur in 50 years (the level of significant degradation) at an effluent concentration of 18.2 mg/ L and load of 1.89 lbs/day or 691 lbs/year. Therefore the effluent limit for total phosphorous discharged to the drainfield shall not exceed 1.89 lbs/day or 691 lbs/year for Outfall 001. The water quality based effluent limit for Outfall 001 will therefore be set at 1.89 lb/day.

OUTFALL 002

Using this depth to limiting layers (10 feet), a phosphorous load based on average phosphorous concentrations and the design capacity of the treatment system, the expected phosphorous load to state waters and the distance from Outfall 002 to the closest surface water, the same unnamed slough (approximately 3,000 feet south southwest and down gradient of the proposed drainfields) the breakthrough time for phosphorus is 281 years. This breakthrough time is considered nonsignificant pursuant to Montana's Nondegradation criteria [ARM 17.30.715(1)(e)].

A phosphorous breakthrough from outfall 002 would occur in 50 years (the level of significant degradation) at an effluent concentration of 59.4 mg/ L and load of 1.1 lbs/day or 402 lbs/year. Therefore the effluent limit for total phosphorous discharged to the drainfield shall not exceed 1.1 lbs/day or 402 lbs/year for Outfall 002. The water quality based effluent limit for outfall 002 will therefore be set at 1.1 lb/day.

The proposed water quality and nondegradation effluent limits for Outfalls 001 and 002 are presented in Table 4.

Table 4. Water-Quality Based Effluent and Nondegradation Limits for Outfalls 001 & 002

Parameter	Concentration (mg/L) Daily Maximum (1)	90 Day Average Load (2) (lbs/ per day)
Outfall 001		
Nitrogen as N	35.8	3.7
Total Phosphorus as P	18.2	1.89
Outfall 002		
Nitrogen as N	65.3	1.2
Total Phosphorus as P	59.4	1.1

(1) See definitions, Part I.A of the permit
(2) Load calculation: lb/d = (mg/L) x flow (gpd) x 8.34 x 10^{-6}

F. Mixing Zone

The Department will grant a standard 500 foot mixing zone for Outfalls 001 and 002 for the single parameter nitrate (as N). The shape of the proposed mixing zones is determined from the drainfield dimensions, ground water table elevation, and ground water flow direction. This information was submitted with the permit application and is discussed in length in Section IV. A. of this document. Ground water quality standards may be exceeded within a Department authorized mixing zone (ARM 17.30.1005), provided that all existing and future beneficial uses of state waters are protected [ARM 17.30.506 (1)].

The permittee must comply with the ground water mixing zone rules pursuant to ARM 17.30 Subchapter 5 and all applicable ground water quality standards. The ground water standard for nitrate (as N) may be exceeded within the mixing zone provided that all existing and future beneficial uses of the state waters are protected (ARM 17.30.1005). The concentration of nitrate (as N) must not exceed 5.0 mg/l on the hydraulically down gradient boundary of the mixing zone

[ARM 17.30.715(1)(d)(iii)].

V. Final Effluent Limits

The proposed final effluent limitations for Outfall 001 and 002 are summarized in Table 5 and are based on more restrictive of the technology based effluent limits and the water quality based effluent limits discussed in section IV.

The permittee submitted technical information indicating the design capacity for Outfalls 001 and 002 as 12,480 gpd and 2,220 gpd respectively. The design flow is the peak flow (daily or instantaneous) for sizing hydraulic facilities, such as pumps, piping, storage and adsorption systems and means the average daily flow for sizing other treatment systems. This value is used in calculations for phosphorous load limits and for calculations for determining the allowable nitrogen concentration at the end of the mixing zone. The combined flow limit from Outfalls 001 and 002 shall not exceed the design capacities of 12,480 gpd and 2,220 gpd based on the daily average.

Table 5. Numeric Effluent Limits for Outfall 001 and 002

Parameter	Concentration (mg/L) Daily Maximum (1)	90 Day Average Load (2) (lbs/ per day)
Outfall 001		
Nitrogen as N	35.8	3.7
Total Phosphorus as P	18.2	1.89
Outfall 002		
Nitrogen as N	54.0	1.2
Total Phosphorus as P	59.4	1.1

(1) See definitions, Part I.A of the permit
(2) Load calculation: lb/d = (mg/L) x flow (gpd) x 8.34 x 10^{-6}

VI. Monitoring Requirements

Effluent limits are established to protect the ground water from a change in water quality that would cause degradation [ARM 17.30.715] or limit a beneficial use [ARM 17.30.1006(1)(a)]. MGWPCS permits must contain conditions which will assure compliance with the ground water quality standards. These conditions include self monitoring of each authorized discharge ARM 17.30.1031 (5). Therefore effluent quality and ground water quality monitoring will be required in this permit. Effluent quality samples or measurements shall be representative of the volume and nature of the monitored discharge.

The permittee shall monitor the flow of the effluent continuously and report the average daily flow in gpd. The effluent flow measurement method shall be either by flow meter and recorder or a totalizing flow meter; dose counts or pump run-times will not be accepted. Flow measurement equipment must have the ability to report an average daily flow.

To ensure that the total phosphorous load is calculated correctly, an accurate average daily flow must be measured. Average daily flow shall be measured when required sampling is conducted

(flow measurement must correspond to sample collection to calculate an accurate load). Effluent quality monitoring shall occur from the dosing tank prior to discharge into the drainfields. The permittee shall monitor the effluent for the constituents in Table 6 at the frequency and with the type of measurement indicated. If no discharge occurs during the entire monitoring period, it shall be stated in a Discharge Monitoring Report (DMR) that no discharge occurred.

Table 6. Outfall 001 and 002 Parameters Monitored at the Dose Tank

Parameter	**Frequency**	**Sample Type[(1)]**
Effluent Flow Rate, gpd[(2) (3)]	Daily[(1)]	Continuous[(1)]
Biological Oxygen Demand (BOD_5), mg/L	Quarterly	Composite
Total Suspended Solids (TSS) mg/L	Quarterly	Composite
Total Kjeldahl Nitrogen (TKN), mg/L	Quarterly	Composite
NO_3+NO_2 as N, mg/L	Quarterly	Composite
Nitrate as N, mg/L	Quarterly	Composite
Ammonia, as N, mg/L	Quarterly	Composite
Total Nitrogen (as N), mg/L	Quarterly	Calculated
Total Nitrogen (as N), lb/d	Quarterly	Calculated
Total Phosphorus (as P), mg/L	Quarterly	Composite
Total Phosphorus (as P), lb/d	Quarterly	Calculated
Chloride, mg/L	Quarterly	Composite

(1) See definitions, Part I.A of the permit
(2) If no discharge occurs during the reporting period, "no discharge" shall be recorded on the DMR report form
(3) Permittee is to report the average daily and 90 day average

A. Ground Water Monitoring

Ground water monitoring will be required in this permit due to the following site-specific criteria:

- This area is experiencing rapid growth with high density development.
- Proximity of the water table to the surface (8-10 ft below the surface).
- The shallow aquifer is comprised of high conductivity geologic materials.
- Lack of advanced wastewater treatment
- The need to distinguish the effects to ground water of the discharging wastewater treatment system.
- To ensure that existing and future beneficial uses are protected

The permittee is required to monitor the ground water on the downgradient edge of both 500-foot mixing zones. The permittee will be required to install a minimum of one monitoring well at the end of each mixing zone. This monitoring well shall be located in the centerline of the terminus of the mixing zone for outfall 001 and outfall 002. The shape of the proposed mixing zone is determined from the drainfield dimensions, ground water table elevation, and ground water flow direction. This information was submitted with the permit application and is discussed in length

in Section IV.A. of this document. Please see section VIII. B. of this document for further information regarding quality monitoring. The permittee will conduct quarterly monitoring for the parameters listed in Table 7.

Table 7. Monitoring Parameters for Monitoring Wells:

Parameter	Frequency	Sample Type (1)
Static Water Level (SWL) (feet below the casing top)	Quarterly	Instantaneous
Specific Conductance, µmhos/cm	Quarterly	Grab
Chloride, mg/L	Quarterly	Grab
Escherichia Coli (Organisms/100 m*l*)	Quarterly	Grab
Total Ammonia, as N, mg/L	Quarterly	Grab
NO_3+NO_2 as N, mg/L	Quarterly	Grab
Nitrate as N, mg/L	Quarterly	Grab

(1) See definitions, Part I.A of this permit

VII. Nonsignificance Determination

The Department has determined that the discharge constitutes a new or increased source and is subject to Montana Nondegradation Policy (75-5-303, MCA; M 17.30.702(16)). The Department has determined these discharges to be nonsignificant with respect to nitrogen concentrations at the end of the mixing zone. Nitrogen concentrations are predicted to be less than 5.0 mg/L (DEQ nitrate sensitivity analysis 2008). Phosphorus load limits are based on nondegradation significance criteria for 50-year break-through to surface water in accordance with ARM 17.30.715(1)(e) (DEQ phosphorous break through analysis 2008). Therefore, discharges in compliance with the limitations of this permit constitute nonsignificant degradation.

VIII. Special Conditions/Compliance Schedules

a) Effluent Flow Measurement

To ensure that the total phosphorous load is calculated correctly, an accurate daily flow must be measured. The Department requires that samples or measurements be representative of the volume and nature of the monitored discharge. Effluent flow shall be monitored from the dose tank immediately prior to discharge into the drainfields. The measurement method shall be either by recorder or a totalizing flow meter dose counts or pump run-times will not be accepted. The permittee shall monitor the flow of the effluent continuously.

b) Monitoring Well Installation

The applicant will be required to install a minimum of two monitoring wells, one at the end of the each mixing zone. These monitoring wells shall be located in the centerline of the terminus of the mixing zones for outfalls 001 and 002. These wells shall be screened from the top of the high water table to 15 feet below the low water table.

Within 60 days of the effective date of the permit the permittee shall submit to the Department for approval, a plan for compliance ground water monitoring well installation as well as a brief summary of a monitoring, sampling and analysis plan for monitoring wells installed on site. The plan is to include the location, conceptual design and construction methods of the planned ground water monitoring wells, and the monitoring, sampling and analysis methods that will be used to meet the monitoring required in the permit.

Ground water quality monitoring shall begin within 180 days of the effective date of the permit and continue through the duration of the permit. The permittee shall submit to the Department a brief report or letter documenting the results of the monitoring well installation including the final location of the installed monitoring wells, construction details for the well and a report on ground water quality in the from the well. Ground water quality analysis shall include those parameters listed in Table 6.

IX. Information Source

In the development of the effluent limitations, monitoring requirements and special conditions for the draft permit, the following information sources were used to establish the basis of the draft permit and are hereby referenced:

ARM Title 17, Chapter 30, Sub-chapter 5 - Mixing Zones in Surface and Ground Water, September 1999.

ARM Title 17, Chapter 30, Sub-chapter 7 - Nondegradation of Water Quality, March 2000.

ARM Title 17, Chapter 30, Sub-chapter 10 - Montana Ground Water Pollution Control System (MGWPCS), March 2002

Environmental Protection Agency, U.S. EPA NPDES Permit Writers Manual, December 1996

Environmental Protection Agency, U.S. EPA Wastewater Technology Fact Sheet, Package Plants, EPA 832-F-00-016 September 2000.

Environmental Protection Agency, Design Manual: On site Wastewater Treatment System Manual. EPA 625/R-00/008, 2002.

Department of Environmental Quality, Montana Ground water Pollution Control System Permit Application. Received May 31, 2007.

Department of Environmental Quality, Public Water Supply and Subdivisions Waiver/Deviation Request. April 3, 2008

Fetter, C.W., Applied Hydrogeology., 1988

Lauerman, Bruce, Charles., Virus Occurrence and Transport in a Cold-Water, Sand and Gravel Aquifer, Frenchtown Montana.

Professional Consultants Inc. Montana Ground water Pollution Control System Permit Application. submitted to the Department December 2007- August 2008

Regensburger, E. How to Perform a Nondegradation Analysis for Subsurface Wastewater Treatment Systems. Montana Department of Environmental Quality. 2005

United States Department of Agriculture, Natural Resource Conversation Service, http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx .

Prepared By: Louis Volpe September 16, 2008

Appendix A